WHAT IS CLAIMED IS:

1. A material in the form of particles having an average diameter of less than about 500 microns, comprising substrate particles having an ultrathin, inorganic material deposited on the surface thereof.

2. The material of claim 1 wherein the inorganic material has a thickness of from about 0.5 to about 35 nanometers.

3. The material of claim 1 wherein the inorganic material is a metal or an inorganic oxide, nitride, sulfide or phosphide.

4. The material of claim 3 wherein the substrate particles are of a Group 3, 13 or 14 nitride or a Group 4, 6, 13 or 13 or 14 carbide, and the ultrathin inorganic material is an inorganic oxide or a metal.

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5. The material of claim 4 wherein the substrate particles are of a sinterable material and the ultrathin coating is a metal.

6. The material of claim 5 wherein the ultrathin inorganic material is a sintering aid.

7. The material of claim 2 wherein the substrate particles are metal particles and the ultrathin inorganic material is an inorganic oxide, nitride, sulfide or phosphide.

8. The material of claim 7 wherein the metal is iron and the ultrathin inorganic material is transparent to IR radiation.

9. A method for depositing an ultrathin inorganic material on substrate particles comprising conducting a sequence of two or more self-limiting reactions at the surface of

said substrate particles to form coated particles having an ultrathin layer of an inorganic bonded to the surface of said substrate particles.

10. The method of claim 9, wherein the sequence is a binary sequence of reactions represented as

$$M\text{–}Z\text{–}H^* + M^1X_n \rightarrow M\text{–}Z\text{–}M^1X^* + HX$$
$$M\text{–}Z\text{–}M^1X^* + H_2O \rightarrow M\text{–}Z\text{–}M^1\,OH^* + HX$$

wherein Z represents oxygen or nitrogen, M^1 is an atom of a metal or semimetal and X is a displaceable nucleophilic group.

11. The method of claim 10 wherein M^1 is silicon, titanium or aluminum.

12. The method of claim 9 wherein the sequence is a binary sequence of reactions represented as

$$M\text{–}Z\text{–}H^* + M^1X_n \rightarrow M\text{–}Z\text{–}M^1X^* + HX$$
$$M\text{–}Z\text{–}M^1X^* + NH_3 \rightarrow M\text{–}Z\text{–}M^1\,NH^* + HX$$

wherein Z represents oxygen or nitrogen, M^1 is an atom of a metal or semimetal and X is a displaceable nucleophilic group.

13. The method of claim 10 wherein the sequence is a binary sequence of reactions represented as

$$M\text{–}Z\text{–}H^* + M^1X_n \rightarrow M\text{–}Z\text{–}M^1X^* + HX$$
$$M\text{–}Z\text{–}M^1X^* + H_2S \rightarrow M\text{–}Z\text{–}M^1\,SH^* + HX$$

wherein Z represents oxygen or nitrogen, M^1 is an atom of a metal or semimetal and X is a displaceable nucleophilic group.

14. The method of claim 9 wherein the substrate particles are an inorganic nitride or carbide.

15. The method of claim 9 wherein the sequence of reactions is continued until a coating of desired thickness is obtained.

16. The method of claim 15 wherein the ultrathin inorganic material has a thickness of about 0.5 to about 35 nanometers.

17. The method of claim 9 wherein a precursor reaction is conducted to impart functional groups on the surface of the substrate particle before conducting said sequence of reactions.

18. The method of claim 9 wherein said sequence of reactions is a sequence of catalyzed reactions.

19. The method of claim 9 wherein said sequence of reactions is a binary sequence of reactions comprising contacting said substrate particle with alternately with a metal halide and a metal halide reducing agent.

20. The method of claim 19 wherein said metal halide is a fluoride or chloride of tungsten, rhenium, molybdenum, antimony, selenium, thallium, chromium, platinum, ruthenium, iridium, or germanium.

21. A resin matrix filled with particles of claim 1.

22. An electronic component encapsulated with a resin matrix of claim 21.

23. A method of making a cermet part, comprising forming a shaped mass of particles of claim 5, and then exposing said shaped mass to conditions sufficient to sinter the particles to form a part.

24. The method of claim 23, wherein said ultrathin inorganic material is cobalt, aluminum, or nickel aluminide.

25. A method of making a ceramic material, comprising forming a shaped mass of particles of claim 6 and then exposing said shaped mass to conditions sufficient to sinter the particles to form a shaped part.

26. A method of catalyzing a chemical reaction, comprising conducting said chemical reaction in the presence of particles of claim 1, wherein the ultrathin coating is a metal that is a catalyst for said chemical reaction.

27. The resin matrix of claim 21, wherein the particles are BN particles coated with an ultrathin layer of alumina, which is in turn coated with an ultrathin layer of silica.

28. The resin matrix of claim 27, wherein the substrate particle is a metal and the inorganic material is a conformal coating of a non-conductive inorganic material.

29. The resin matrix of claim 27, wherein the substrate particle is a metal and the inorganic material is a conformal coating of an inorganic material having surface O-H, N-H or S-H groups.

30. The material of claim 1 which is non-agglomerated.

31. The material of claim 30 wherein the inorganic material forms an ultrathin, conformal coating.

32. The material of claim 1 wherein the substrate particle is a metal fuel and the inorganic material is an oxidizer.

33. The material of claim 32 wherein the metal fuel is aluminum and the oxidizer is NiO, WO_3, Co_3O_4, MnO or SnO.

34. An explosive device comprising the material of claim 33.

35. A thermite rod comprising the material of claim 33.

36. The material of claim 1 wherein the substrate material is iron and the inorganic material is silica.

37. The material of claim 1 wherein the substrate particle is magnetic or paramagnetic.

38. A magnetically responsive composition comprising the material of claim 37, particles of activated carbon, the material and the activated carbon having a particle size of 1-1000 nm, and a therapeutic or diagnostic substance.

39. A magnetically responsive composition comprising the material of claim 37 having a particle size of 1-1000 nm, a biologically inert polymer and a therapeutic or diagnostic substance, wherein the therapeutic or diagnostic substance is sorbed onto a biologically inert polymer, the biologically inert polymer is present of a surface of the material, and the biologically inert polymer is in biologically benign.

40. A method for delivering a pharmaceutical to a specific site in a patent, comprising:
(a) delivering the material of claim 38 into the blood vessel of the patient; and
(b) establishing a magnetic field exterior to the patient and adjacent to the specific site of sufficient field strength to guide a portion of said material through the blood vessel to a point at or near the site so that a therapeutic amount of the therapeutic or diagnostic substance concentrates at the specific site.

41. A method for delivering a pharmaceutical to a specific site in a patent, comprising:
(a) delivering the material of claim 39 into the blood vessel of the patient; and
(b) establishing a magnetic field exterior to the patient and adjacent to the specific site of sufficient field strength to guide a portion of said material through the blood vessel to a point at or near the site so that a therapeutic amount of the therapeutic or diagnostic substance concentrates at the specific site.

42. The method of claim 40 wherein the specific site is a disease site.

43. The method of claim 42 wherein the specific site is a disease site.

44. A material in the form of metal, metal alloy, metal salt, metal organic, metal oxide, metal hydroxide or mixed lattice substrate particles having an average diameter of less than about 1 millimeter wherein the substrate particles have an ultra-thin, conformal coating of alumina on the surface thereof.

45. The material of claim 44 wherein the substrate particles are Fe, Co, Ni, Zn, Mn, Mg, Ca, Ba, Sr, Cd, Hg, Al, B, Sc, Ga, V, Ti, or In.

46. The material of claim 44 wherein the wherein the substrate particles are Nd-Fe-B.

47. The material of claim 44 wherein the wherein the substrate particles are Fe_3O_4, Fe_2O_3, TiO_2, ZnO, or FeO.

48. The material of claim 44 wherein the material is nickel (Ni) and has a particle size of between 50 and 150 microns.